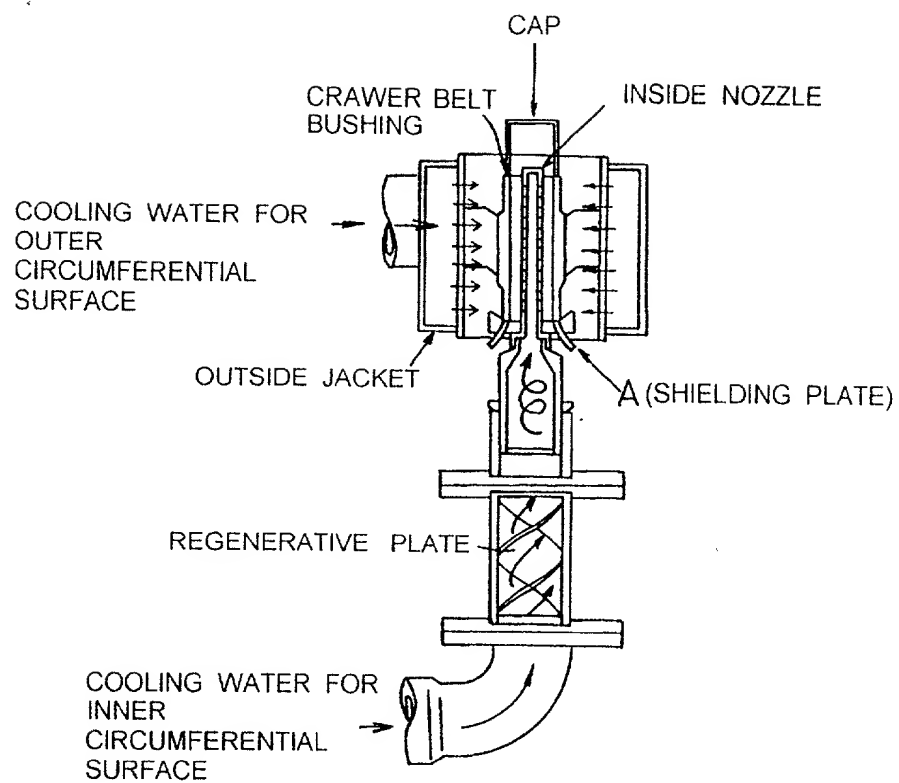


FIG.1



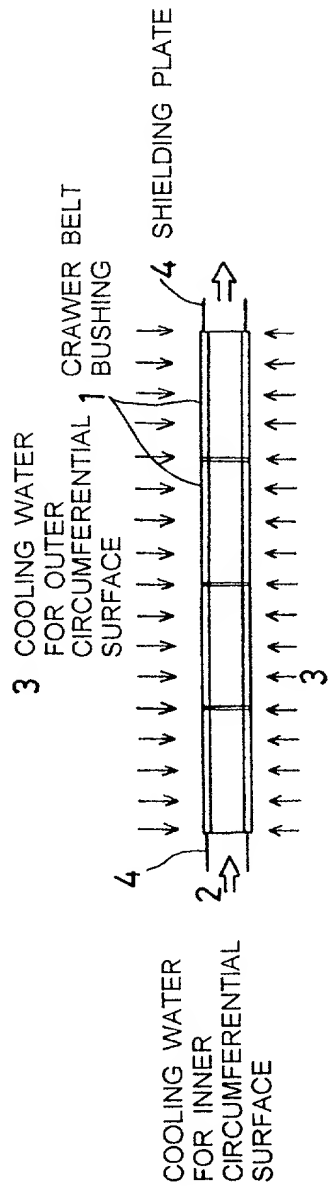


FIG. 2 (a)

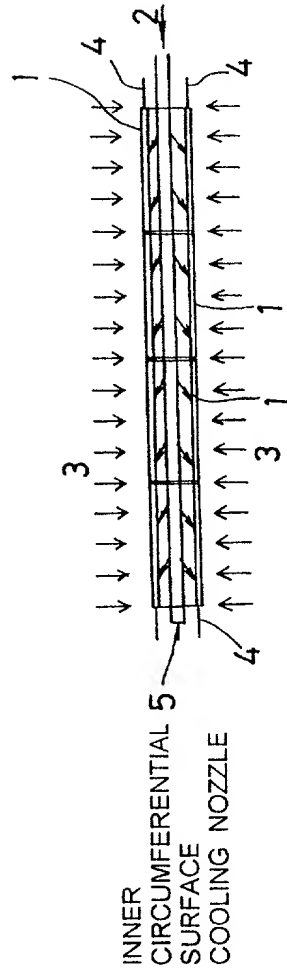


FIG. 2 (b)

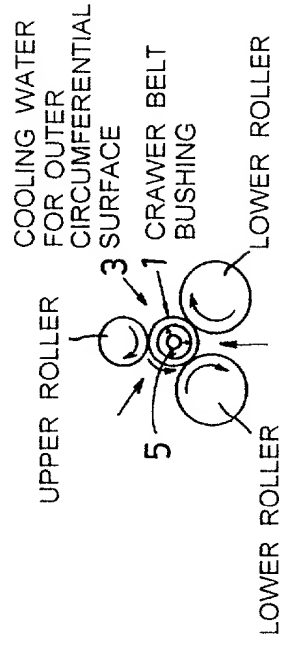


FIG. 2 (c)

FIG.3

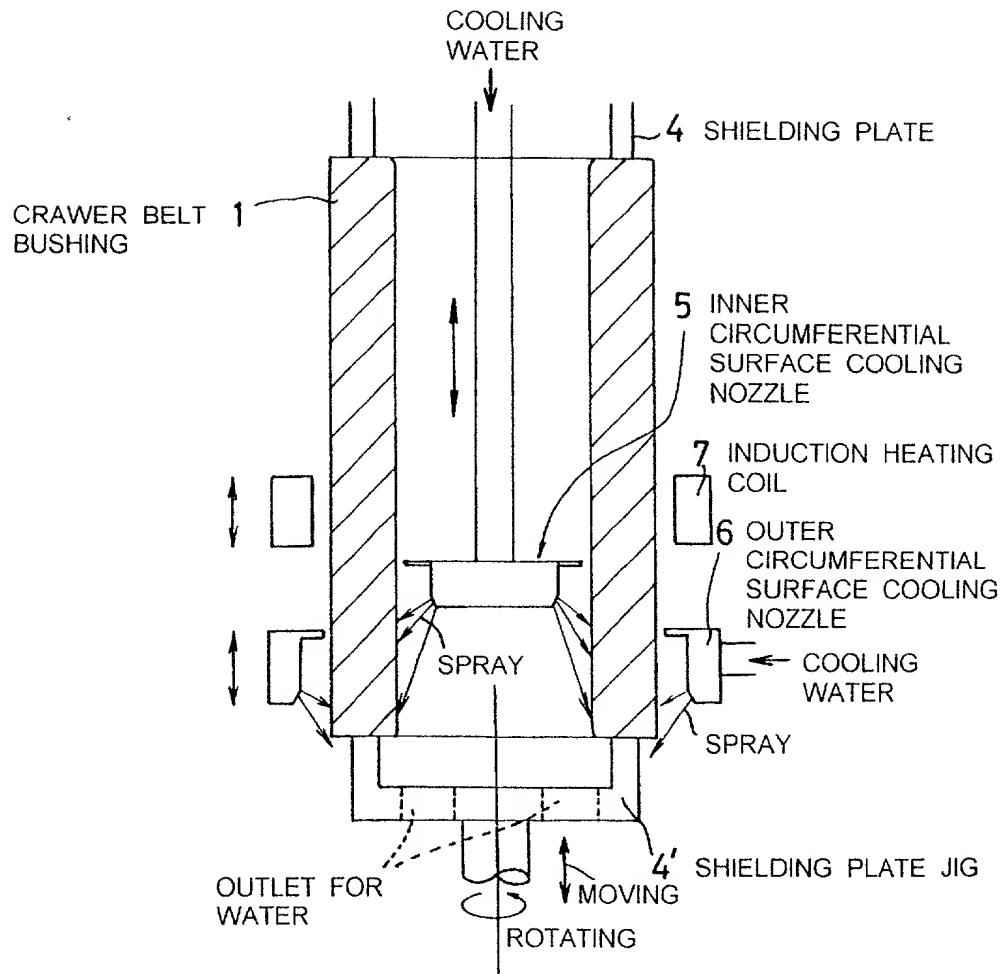


FIG.4

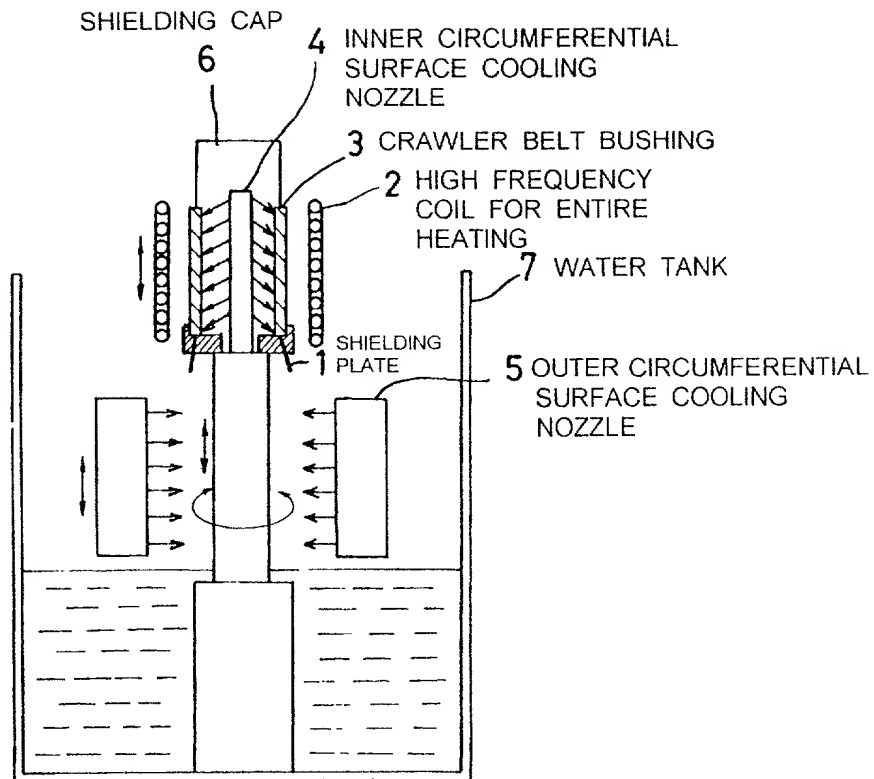
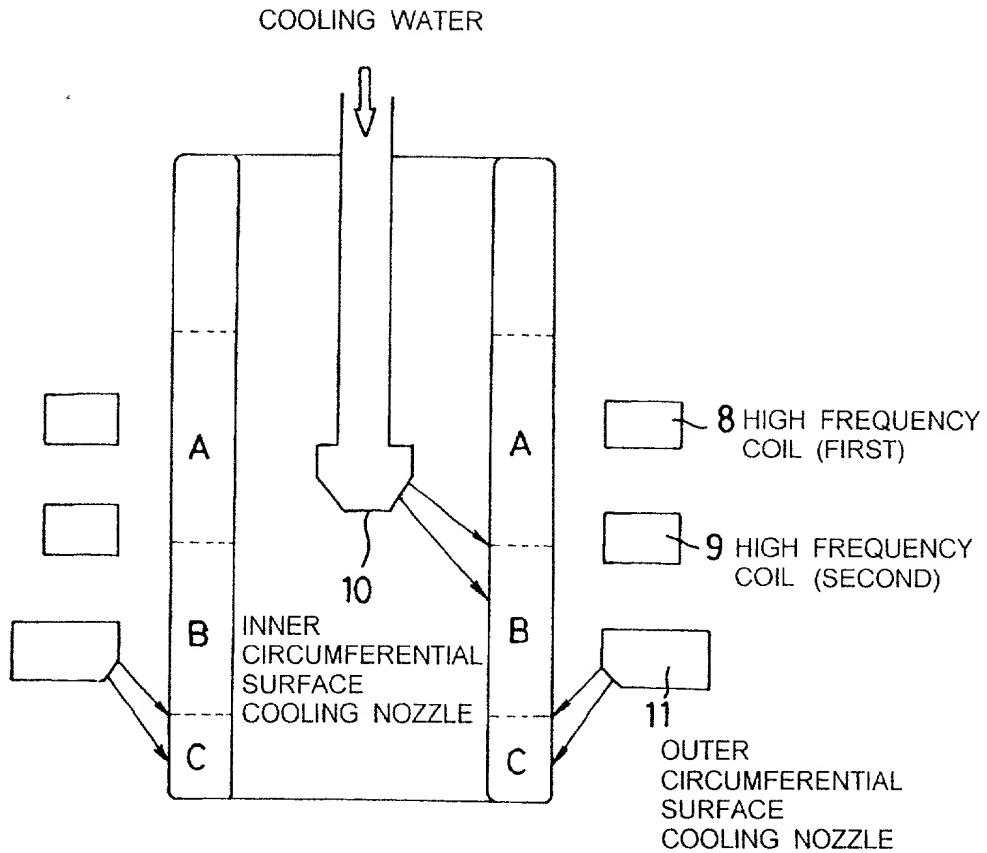


FIG. 5



A REGION: HEATING REGION

B REGION: INNER CIRCUMFERENTIAL SURFACE COOLING + OUTER CIRCUMFERENTIAL SURFACE HEATING COOLING REGION

C REGION: INNER CIRCUMFERENTIAL SURFACE COOLING + OUTER CIRCUMFERENTIAL SURFACE COOLING REGION

FIG. 6

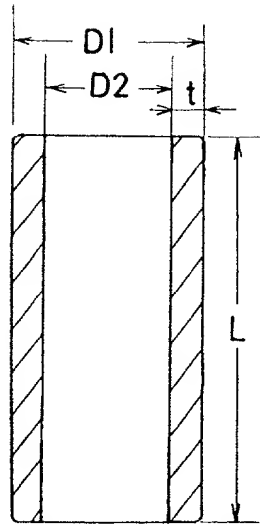


FIG. 7

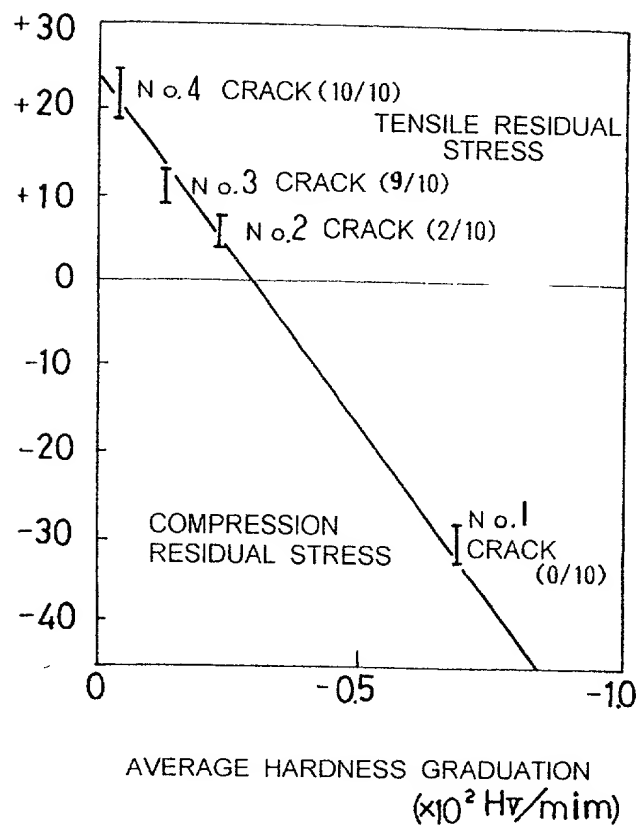


FIG. 8

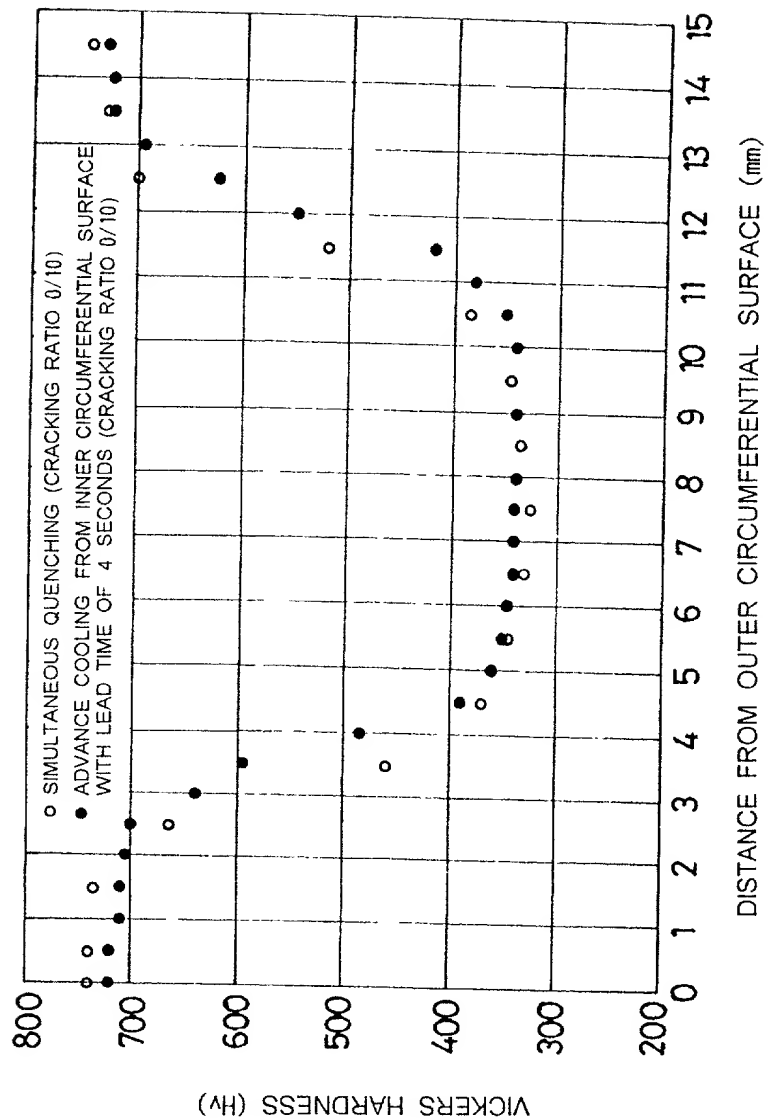


FIG. 9

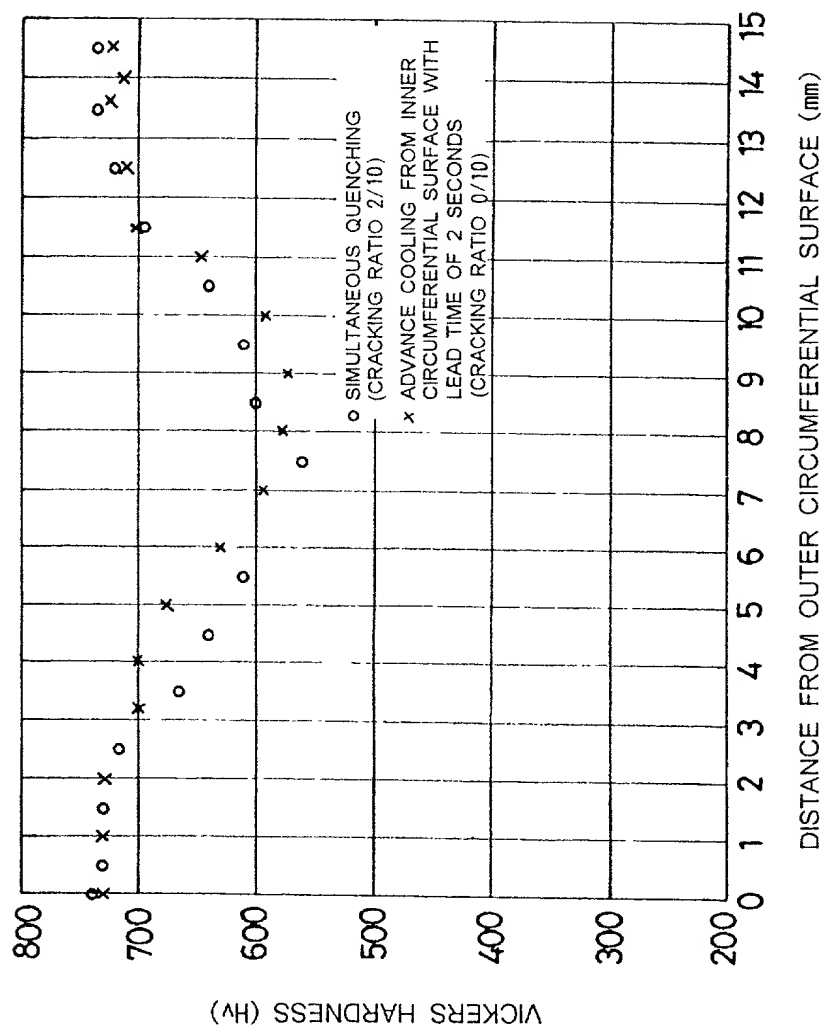


FIG. 10

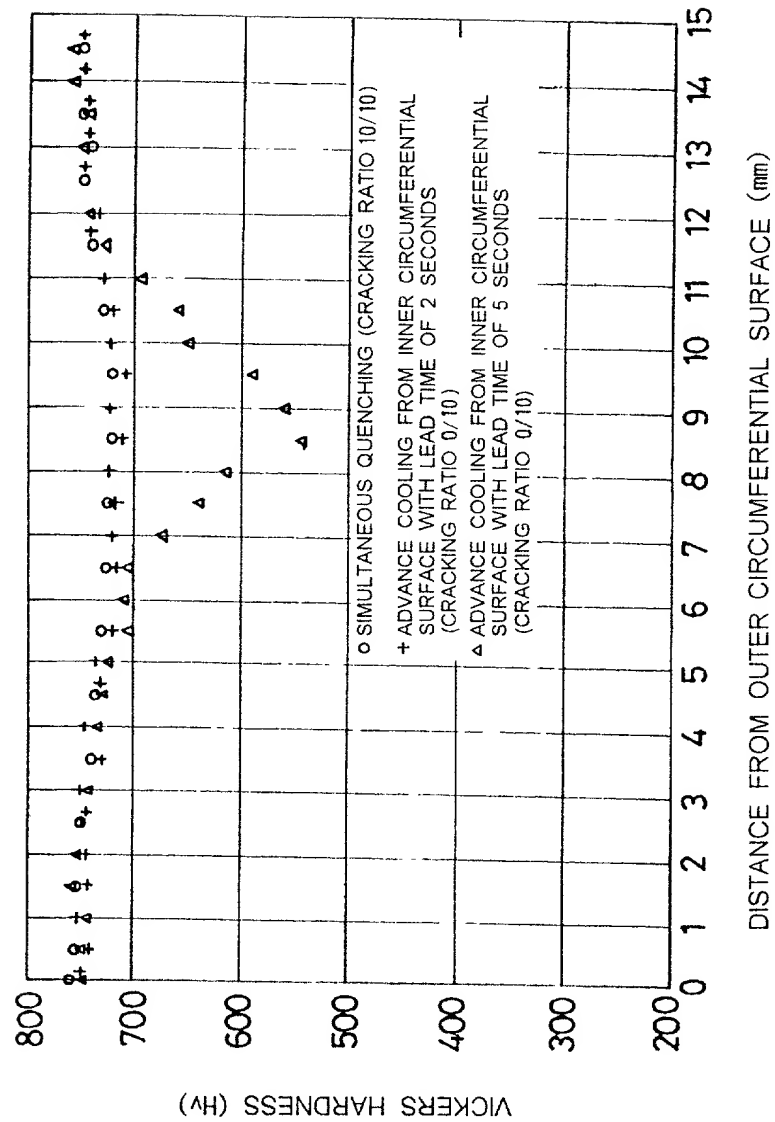


FIG. 11

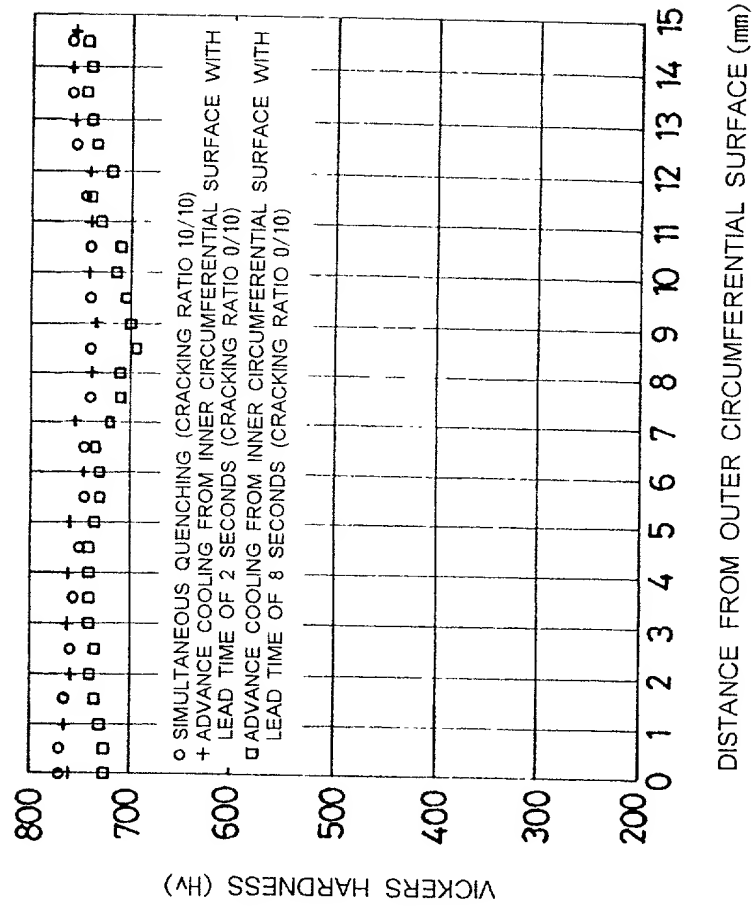


FIG. 12

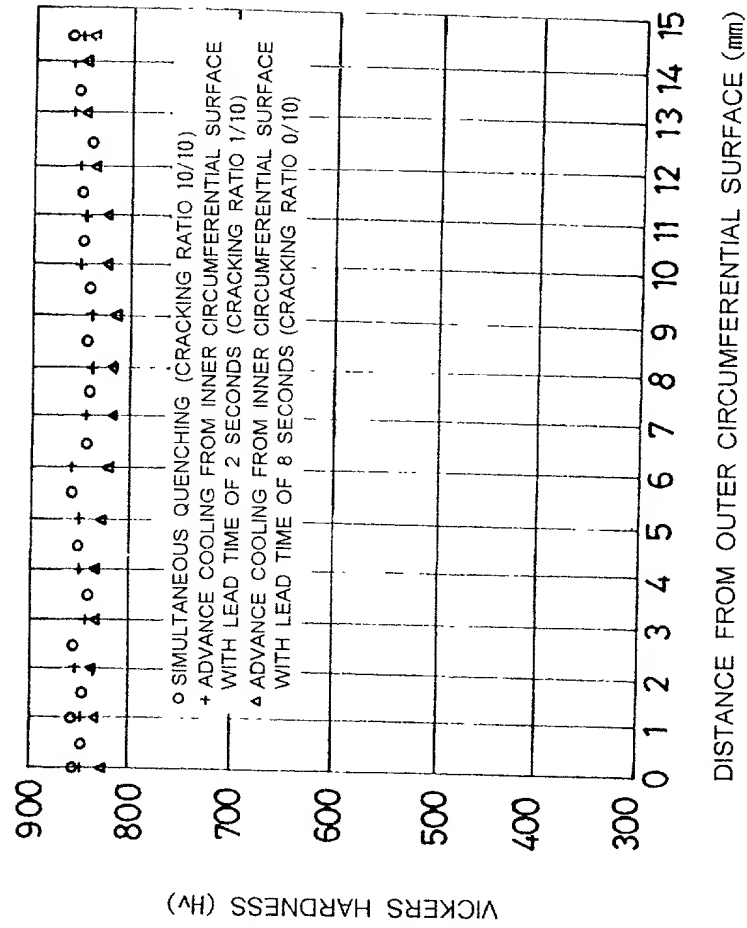


FIG. 13

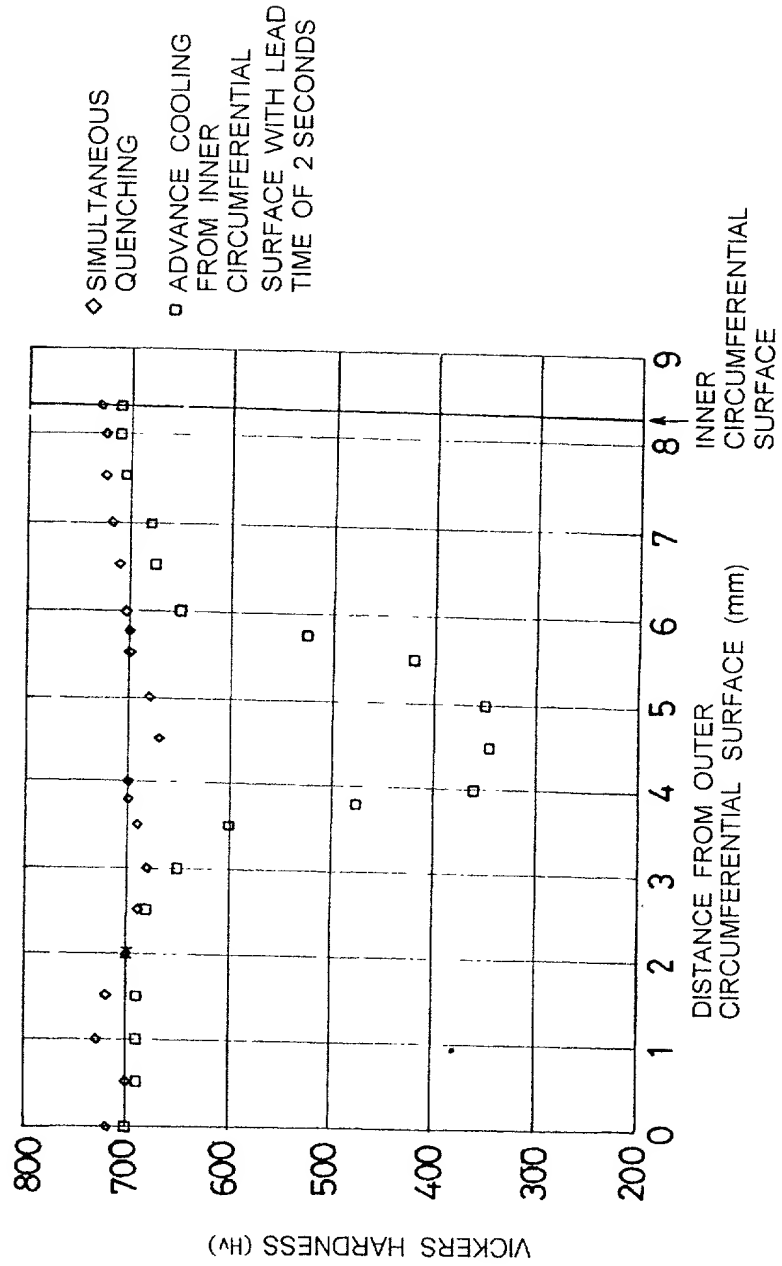


FIG. 14

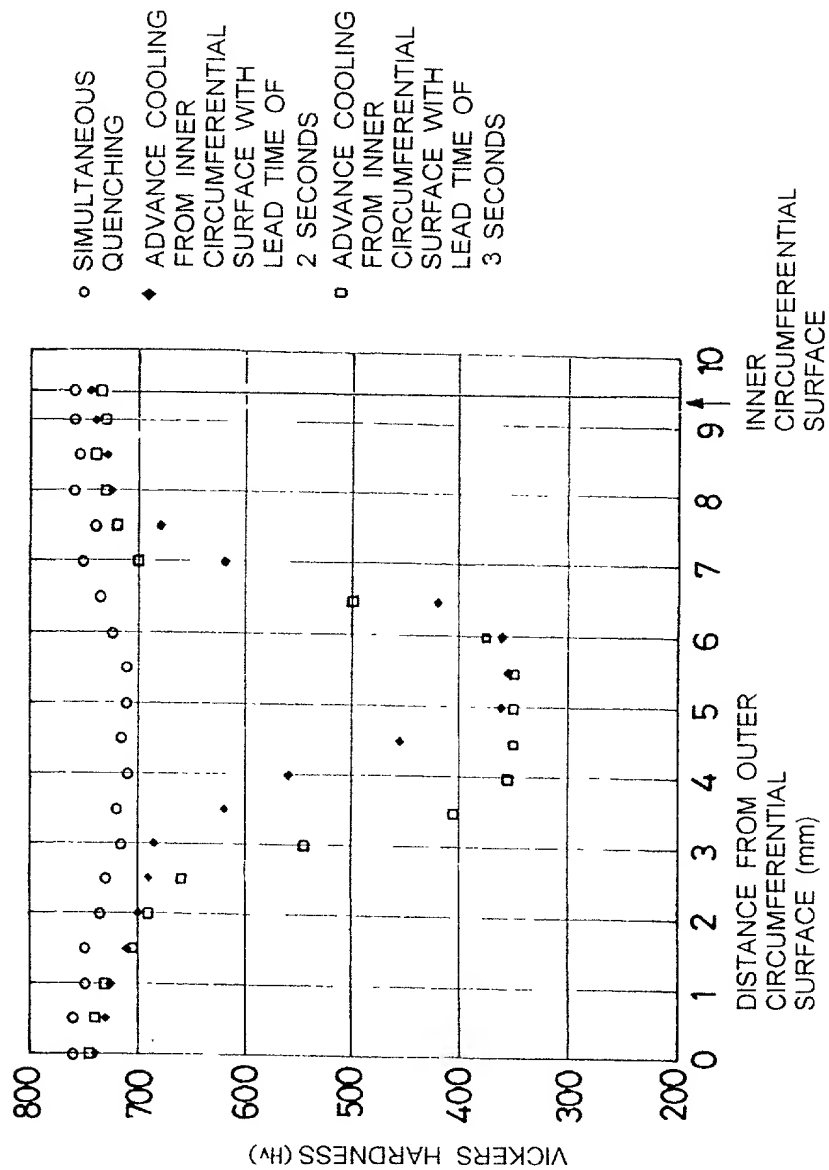


FIG. 15

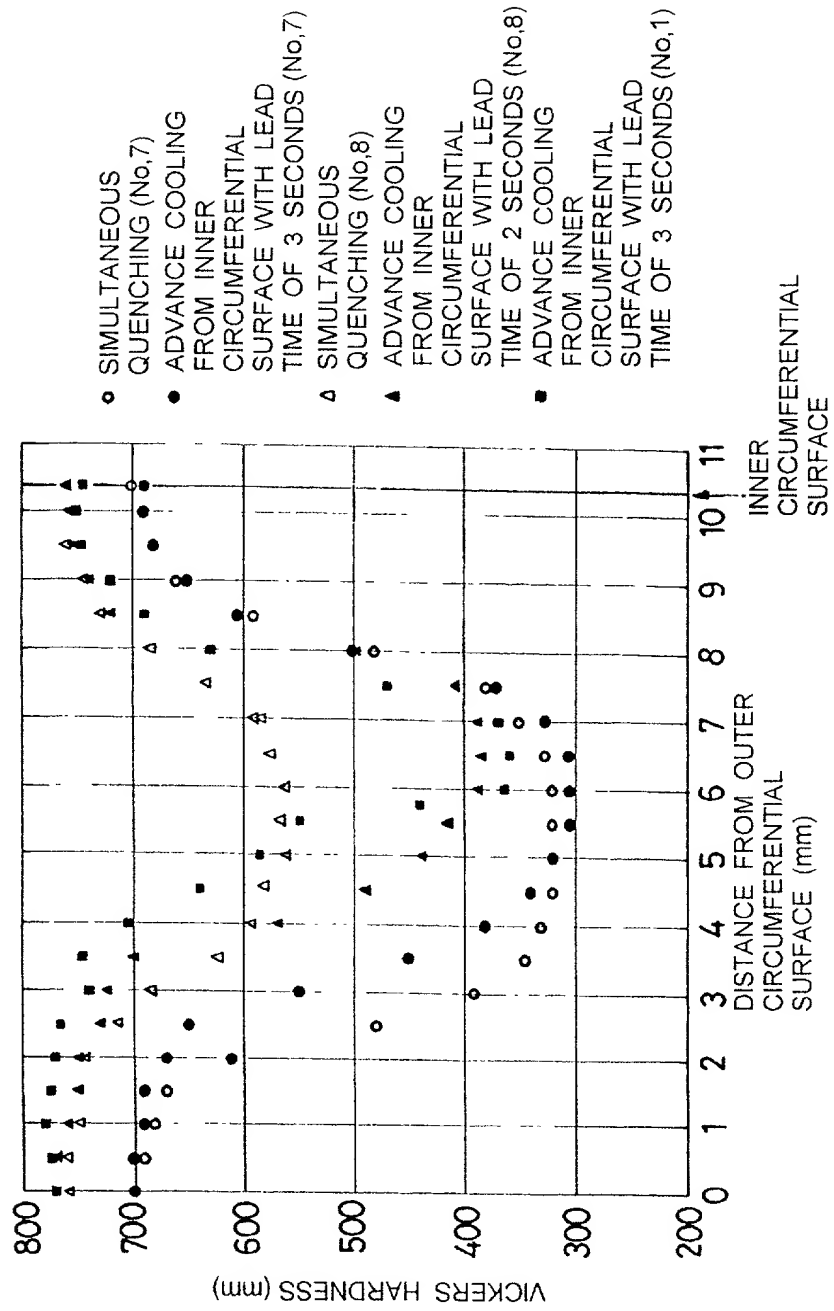


FIG. 16

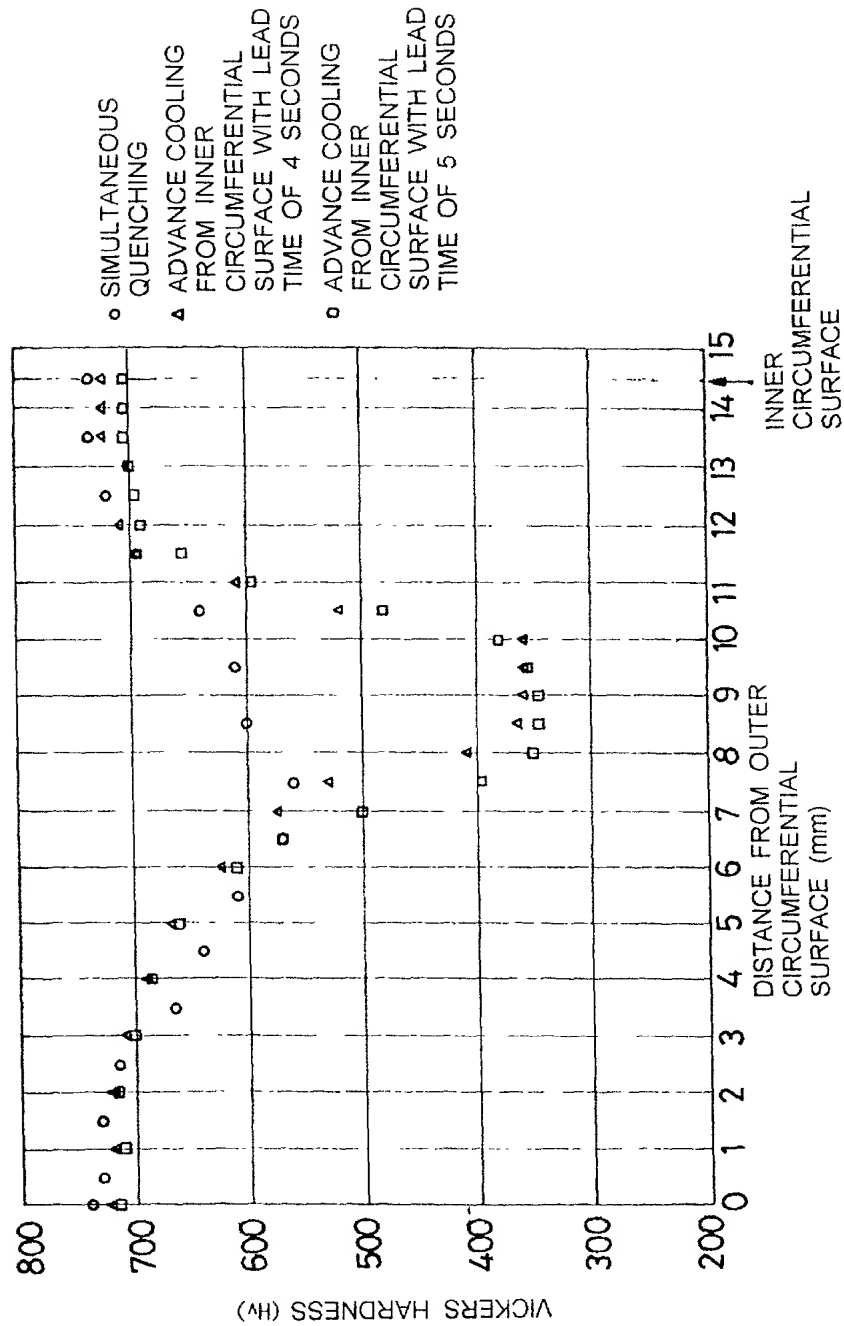


FIG. 17

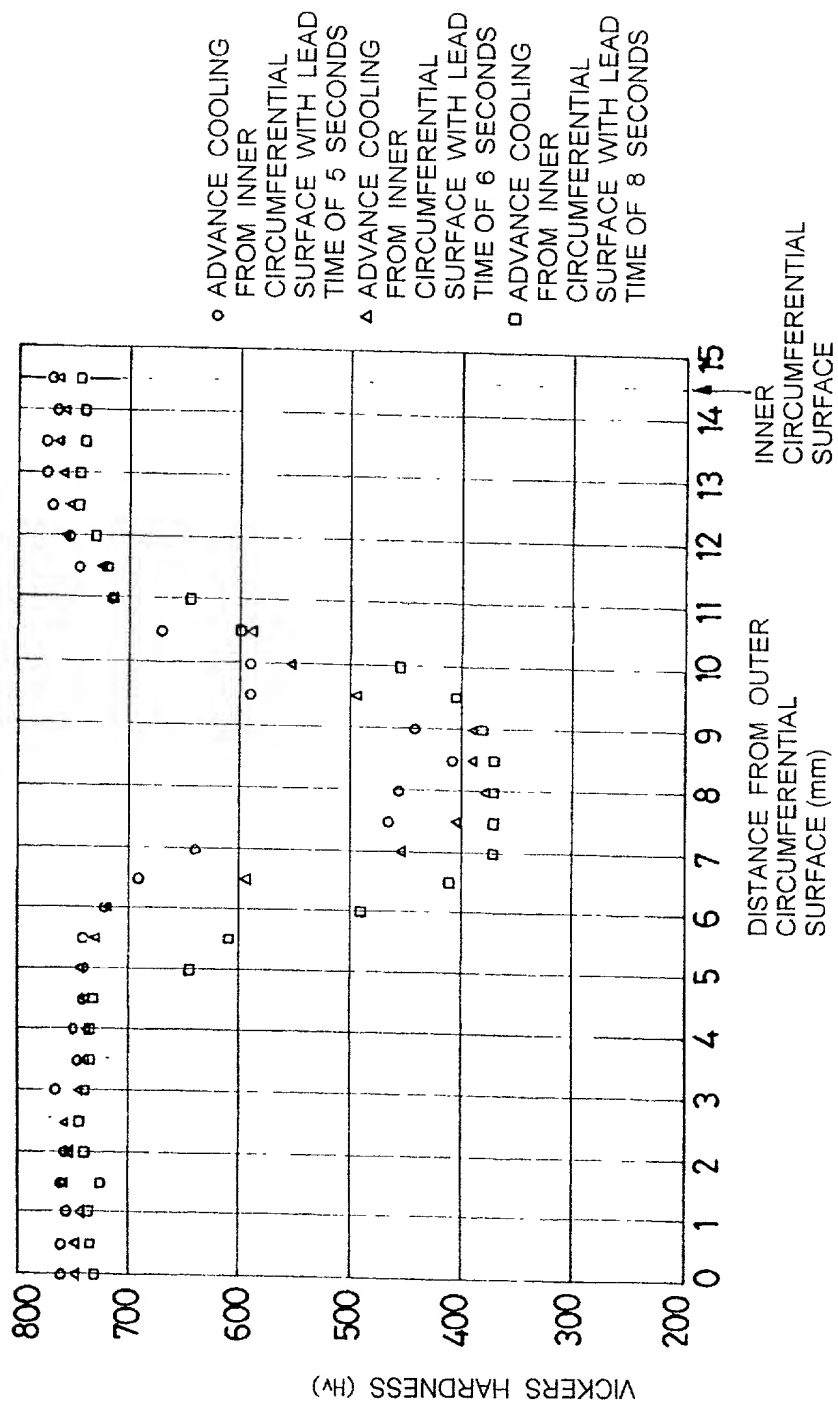


FIG. 18

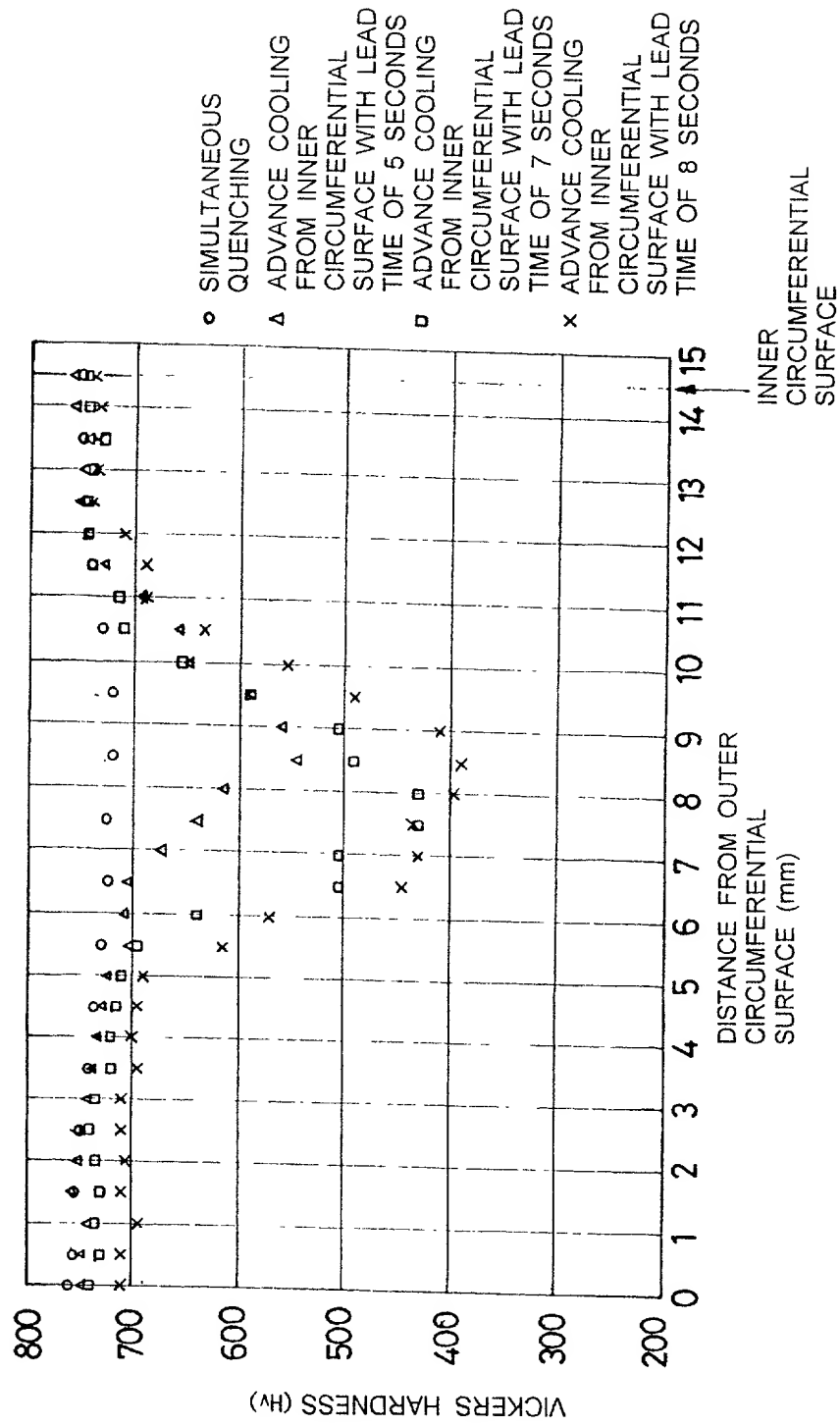


FIG. 19

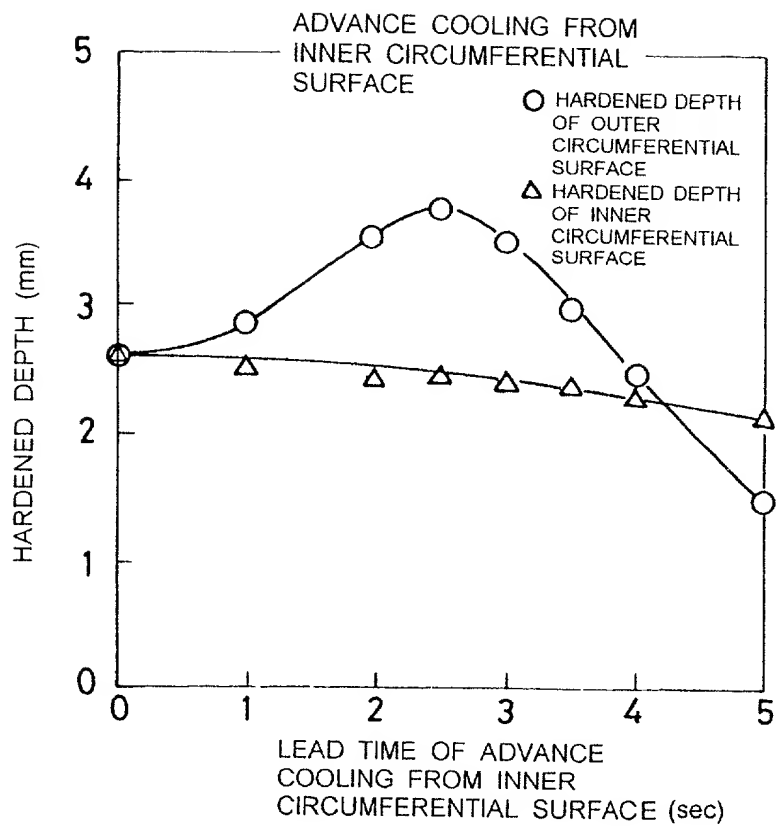


FIG. 20

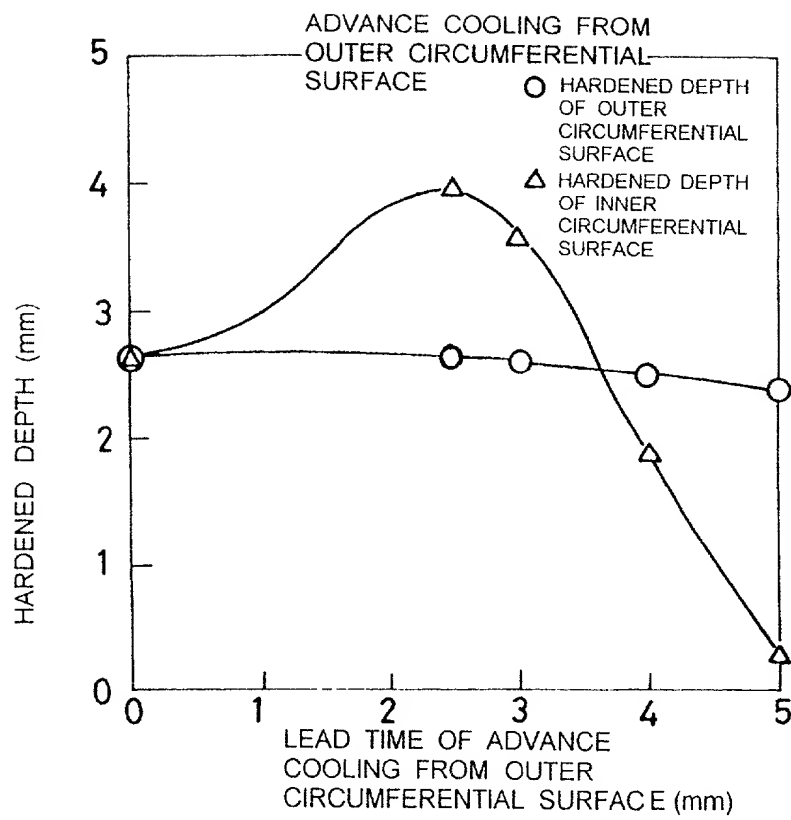


FIG. 21

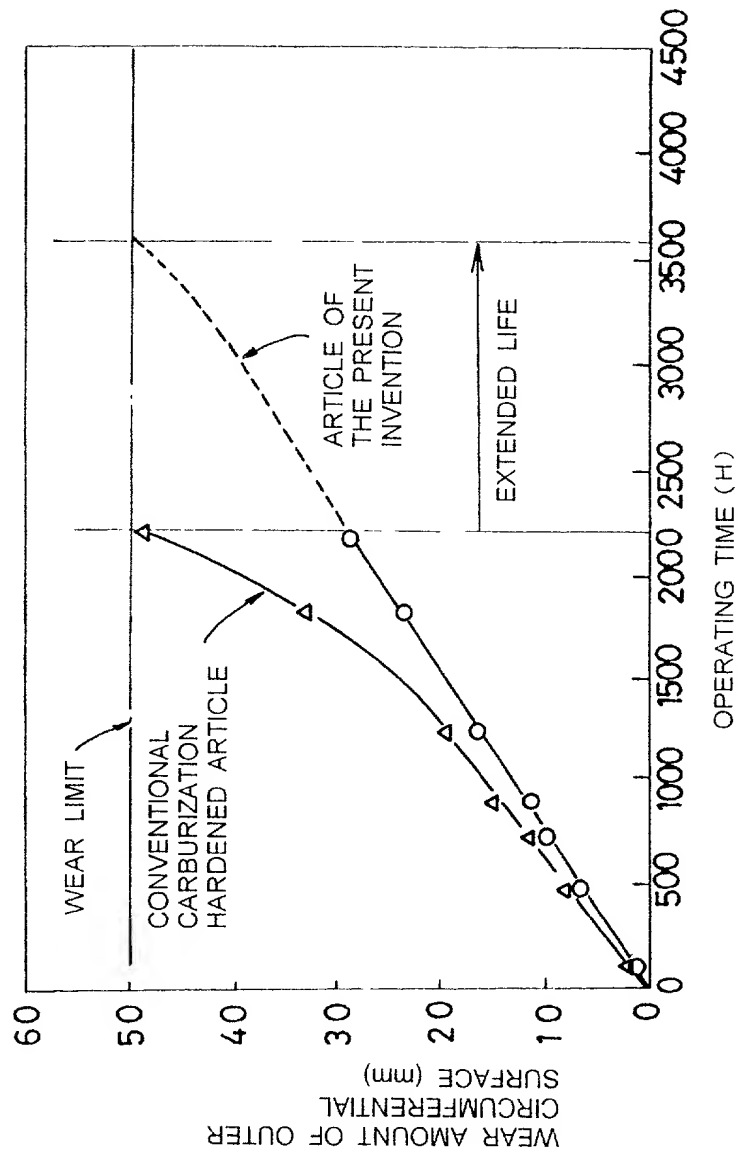
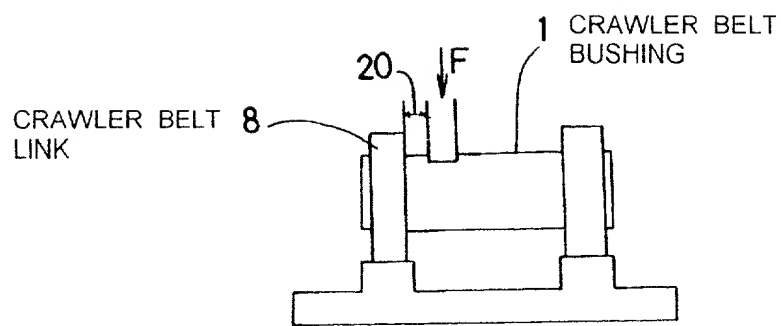


FIG. 22



$F = 2 \sim 37.5 \text{ TON}, 2.5 \text{ Hz}$

FIG. 23

- ARTICLE OF THE PRESENT INVENTION
(1) HAVING COMPOSITION NO. 8
(HARDENED DEPTH OF OUTER CIRCUMFERENTIAL SURFACE 4.5 - 5.0 mm,
HARDENED DEPTH OF INNER CIRCUMFERENTIAL SURFACE 2.5mm)
- ARTICLE OF THE PRESENT INVENTION
(2) HAVING COMPOSITION NO. 7
(HARDENED DEPTH OF OUTER CIRCUMFERENTIAL SURFACE 2.5mm,
HARDENED DEPTH OF INNER CIRCUMFERENTIAL SURFACE 2.5mm)
- △ CARBURIZATION HARDENED ARTICLE

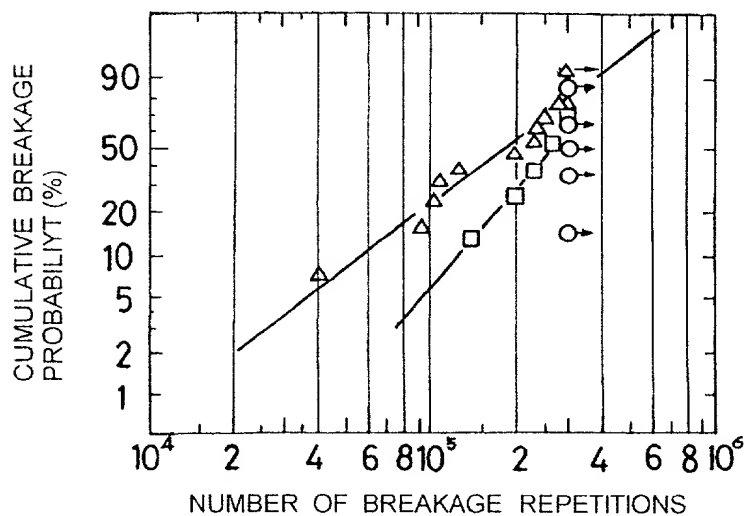
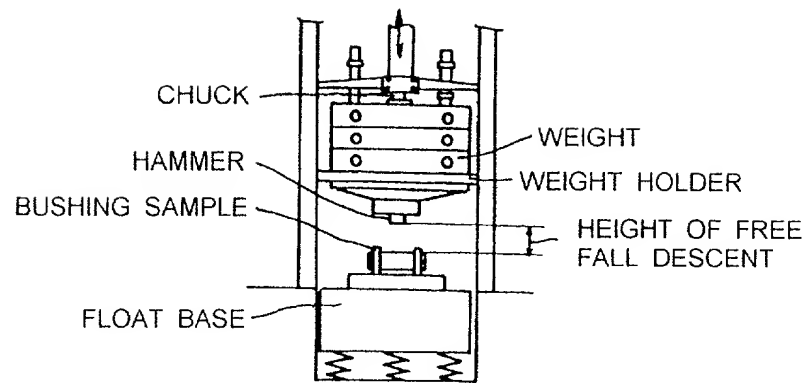


FIG. 24



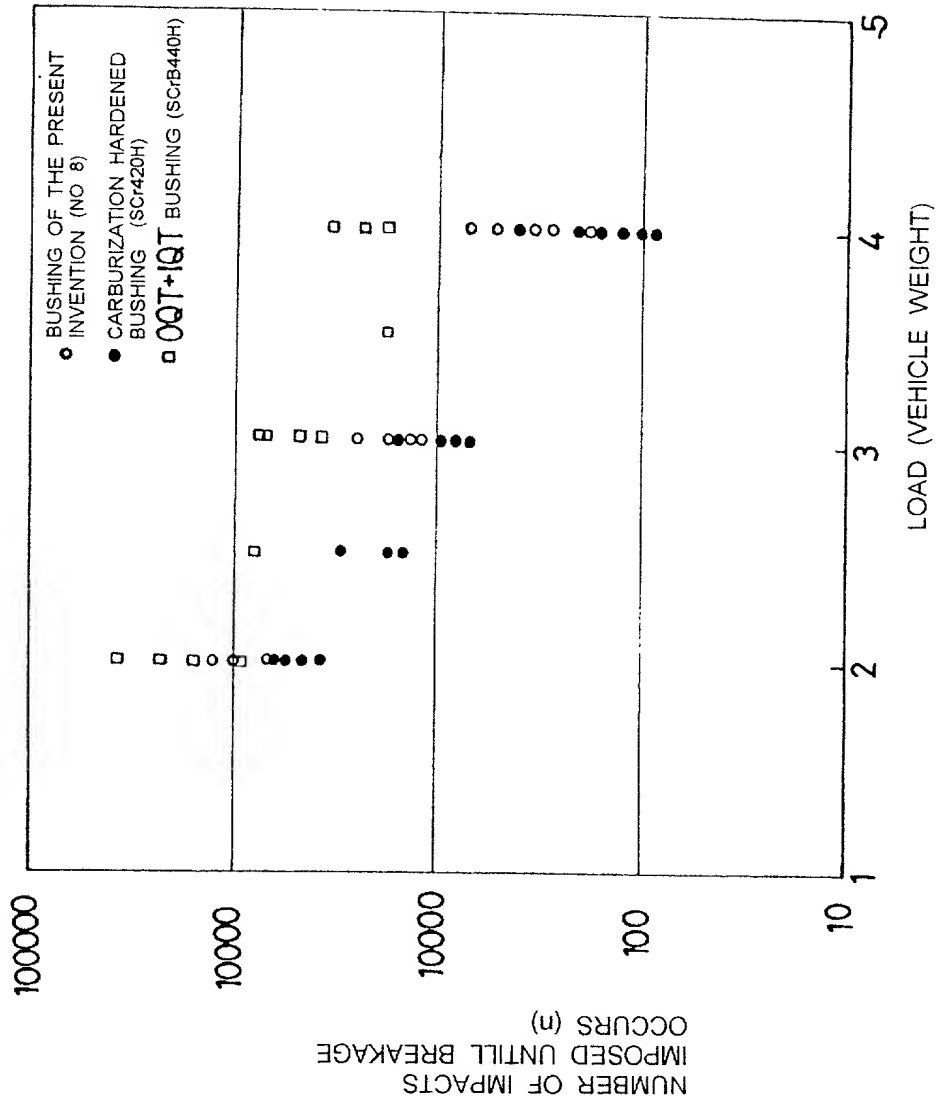


FIG. 26

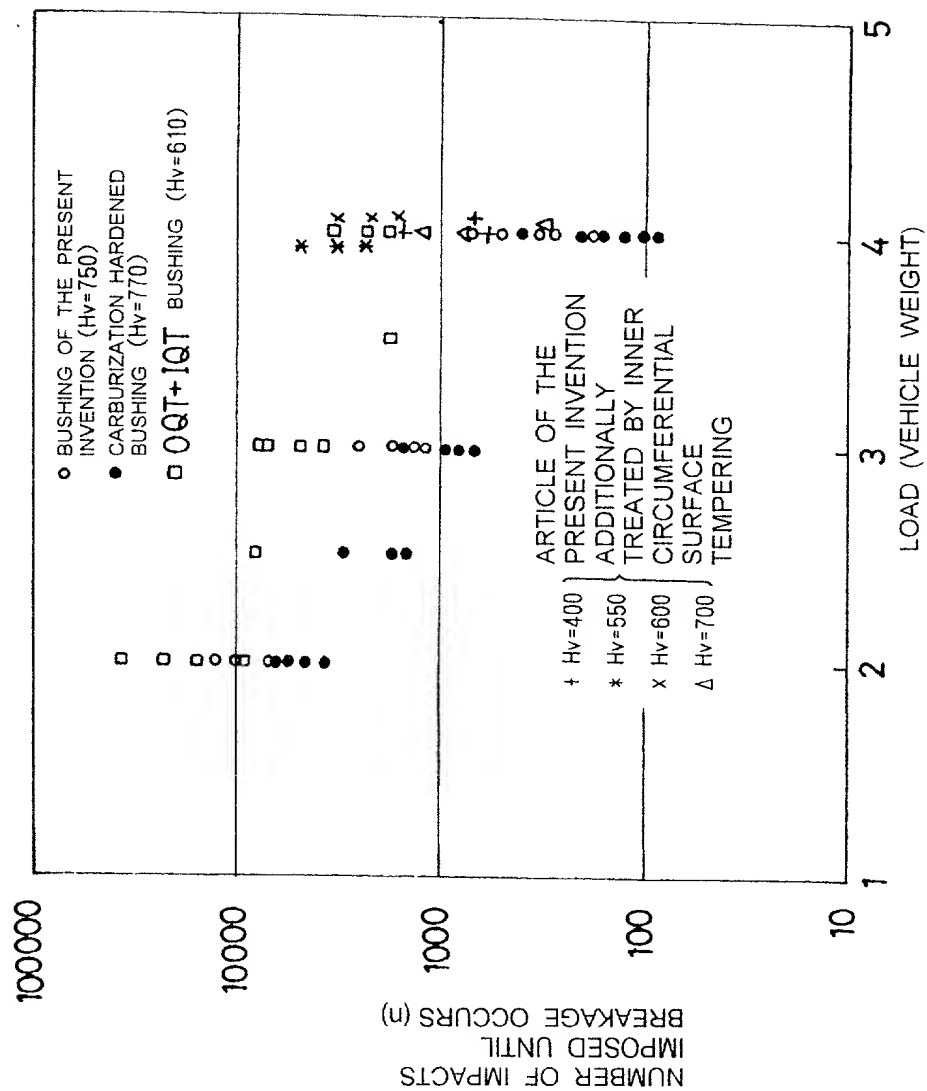


FIG. 27

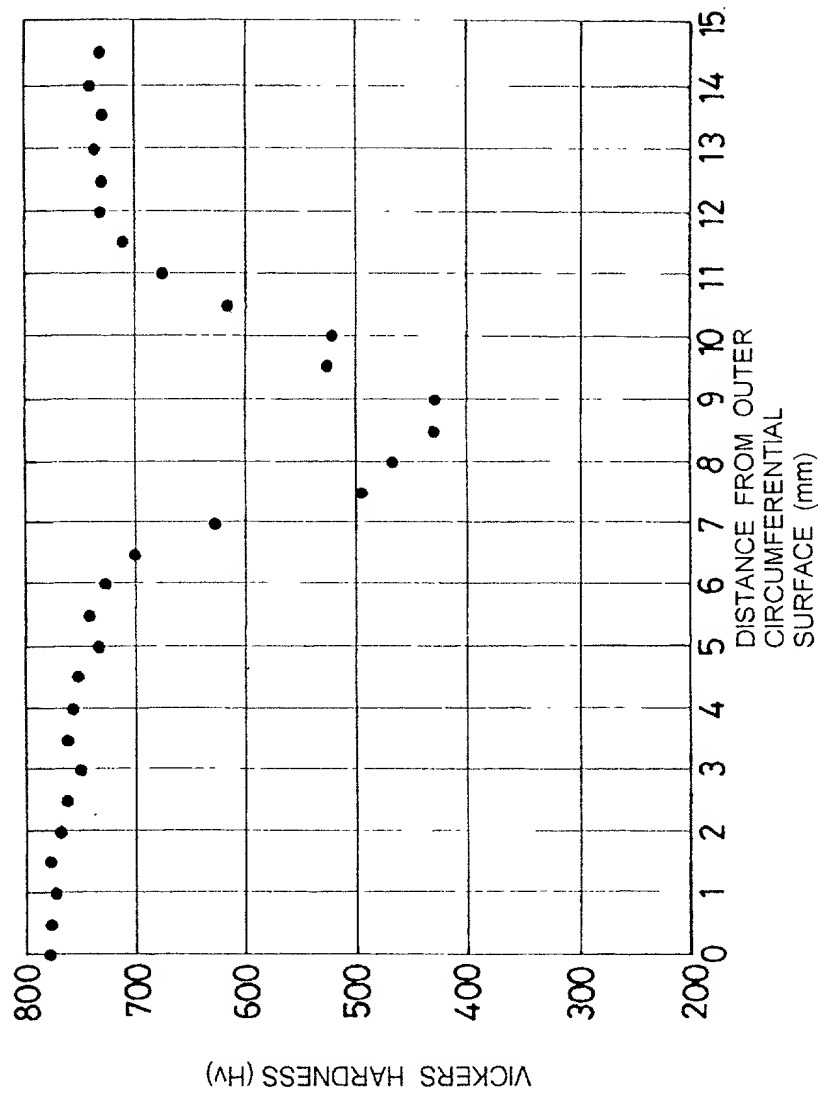


FIG. 28

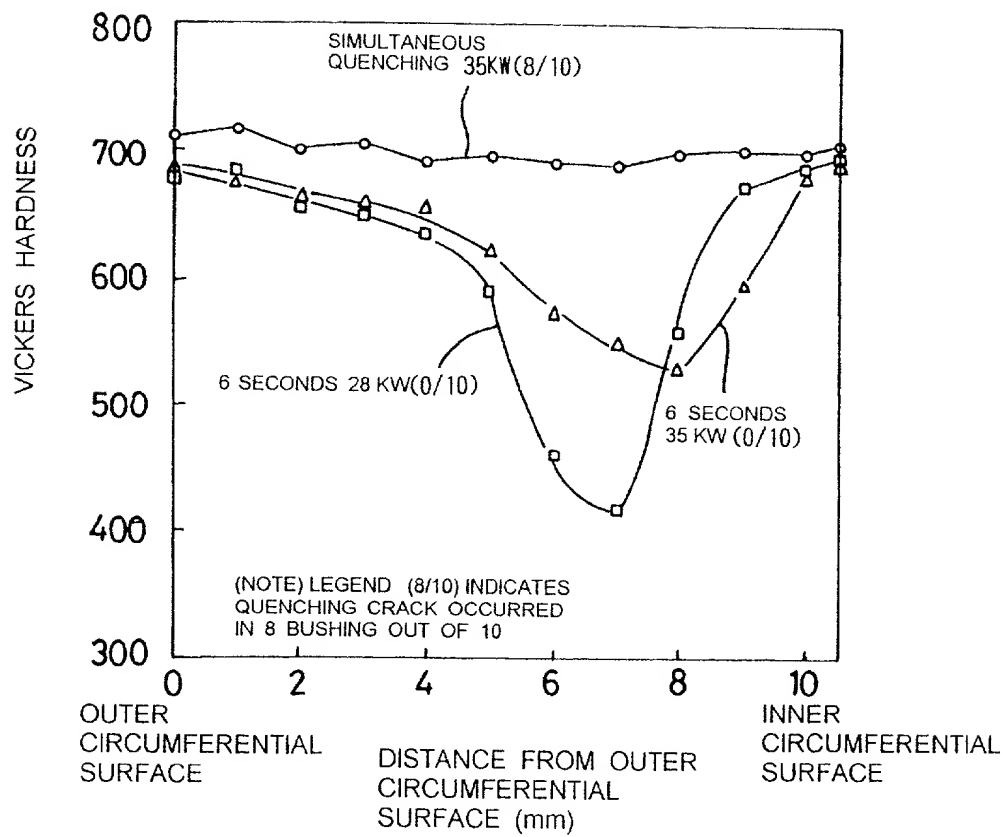


FIG. 29

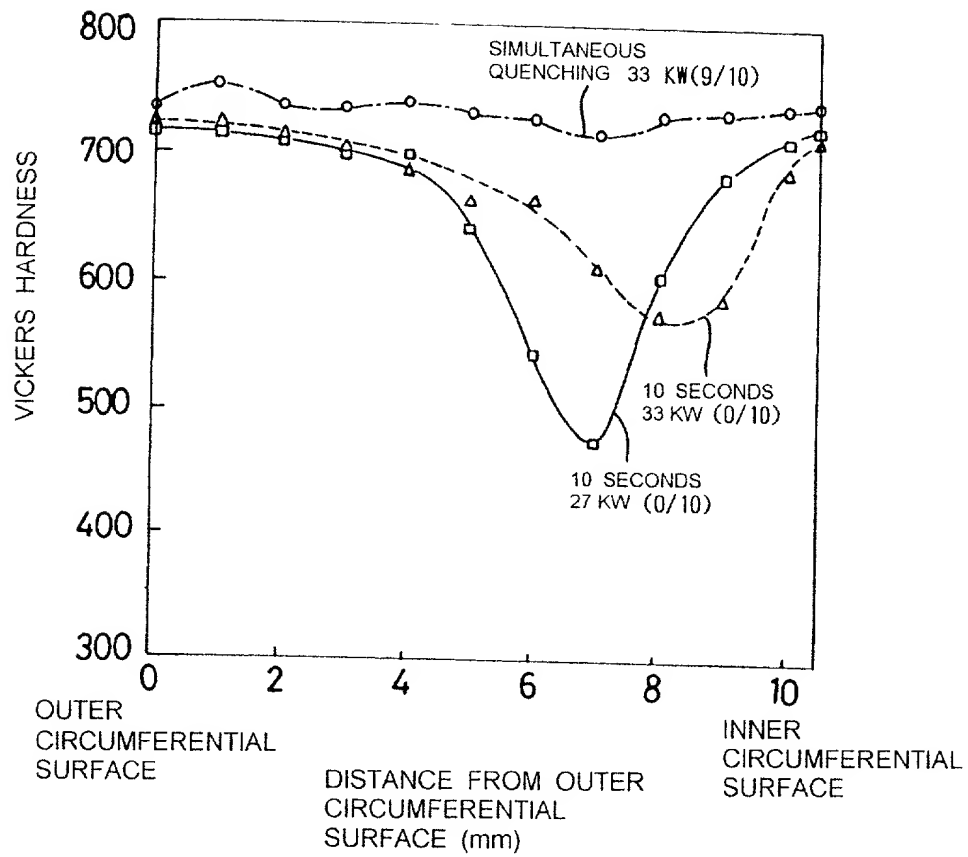


FIG. 30

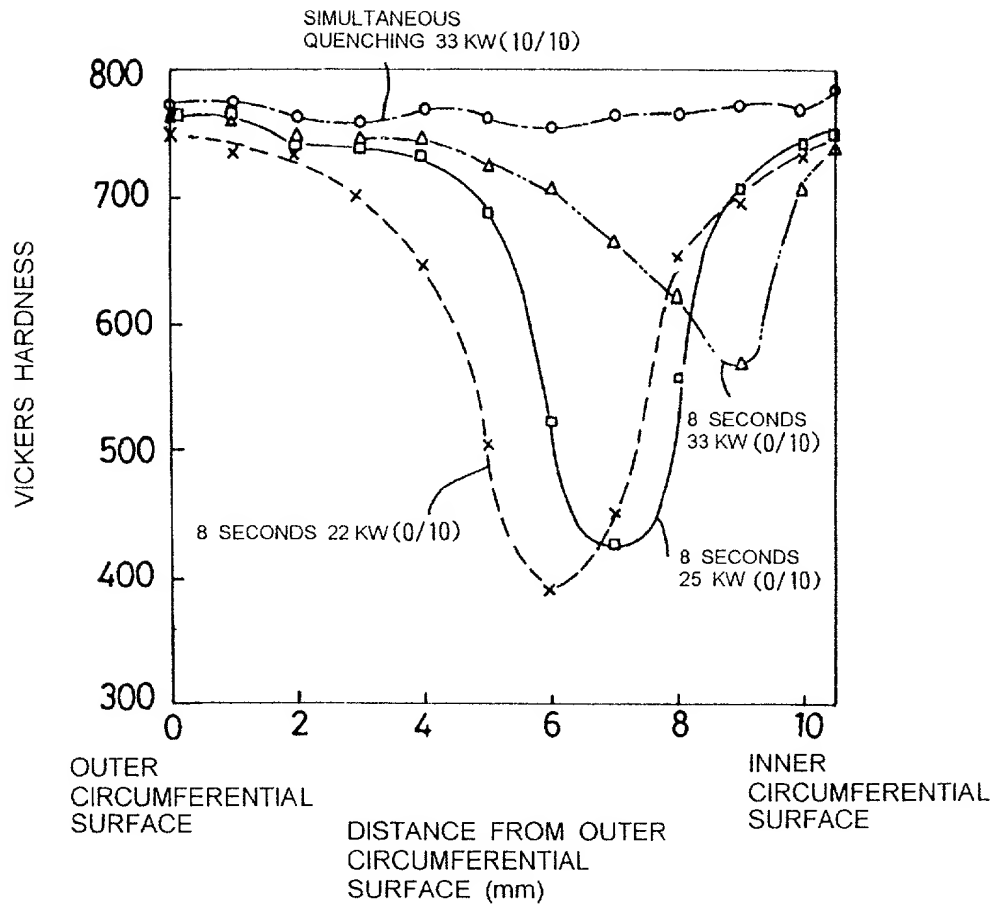


FIG. 31

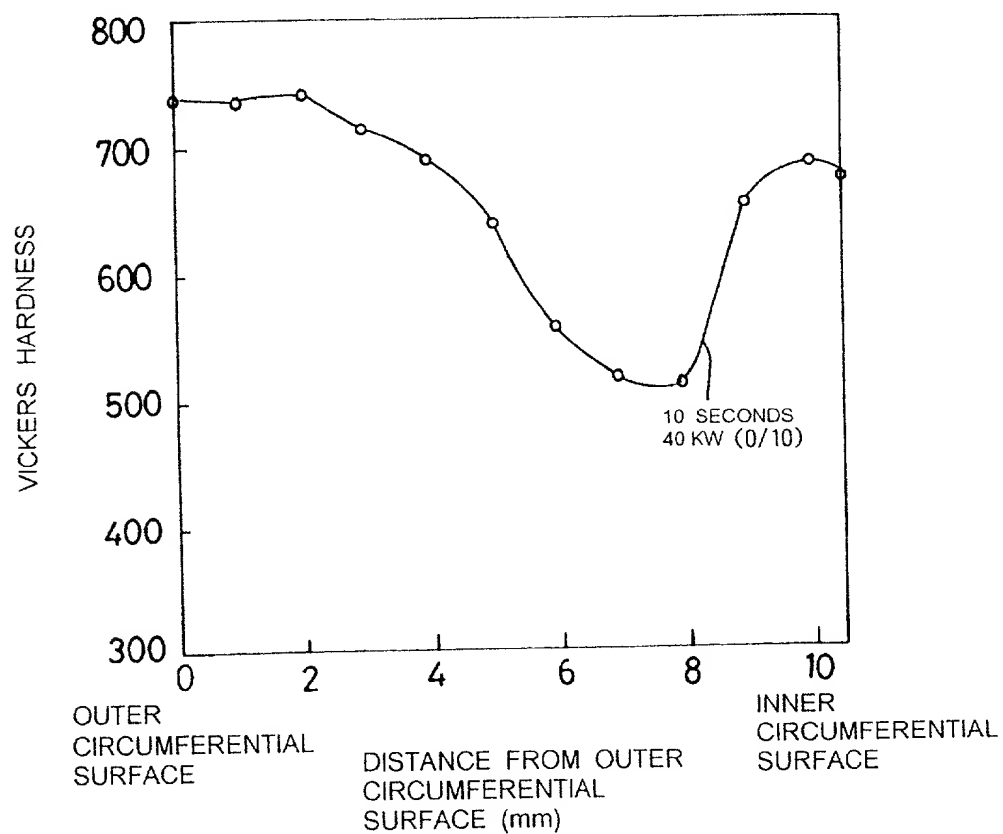


FIG. 32

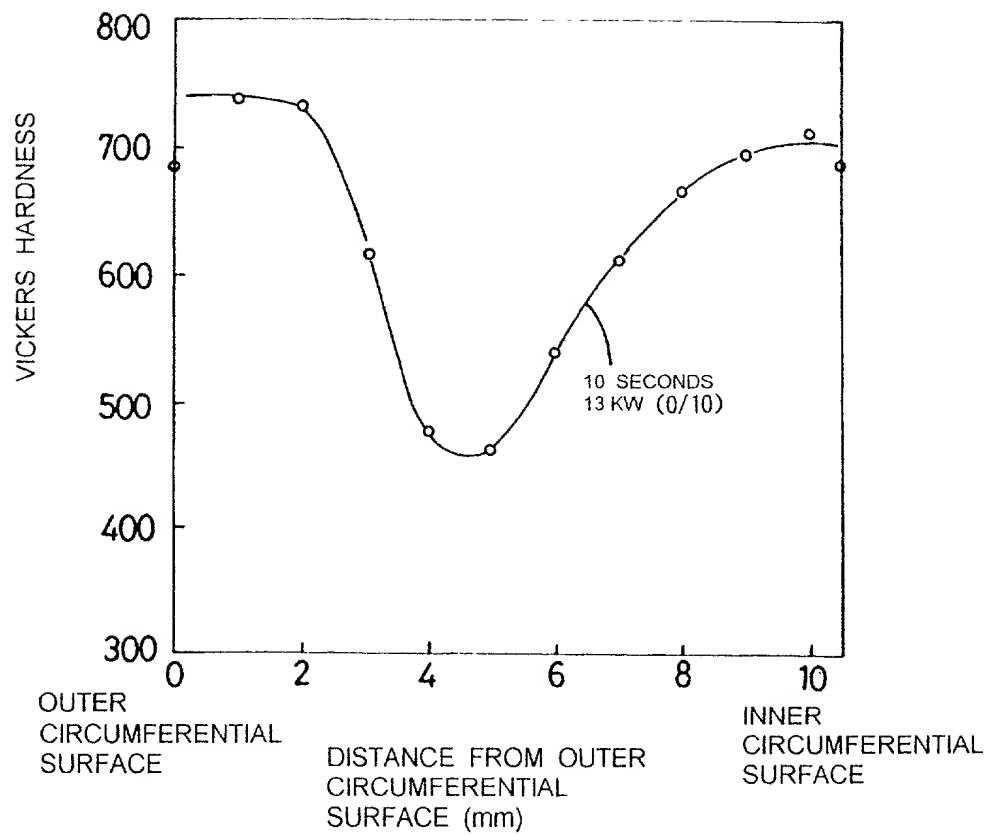
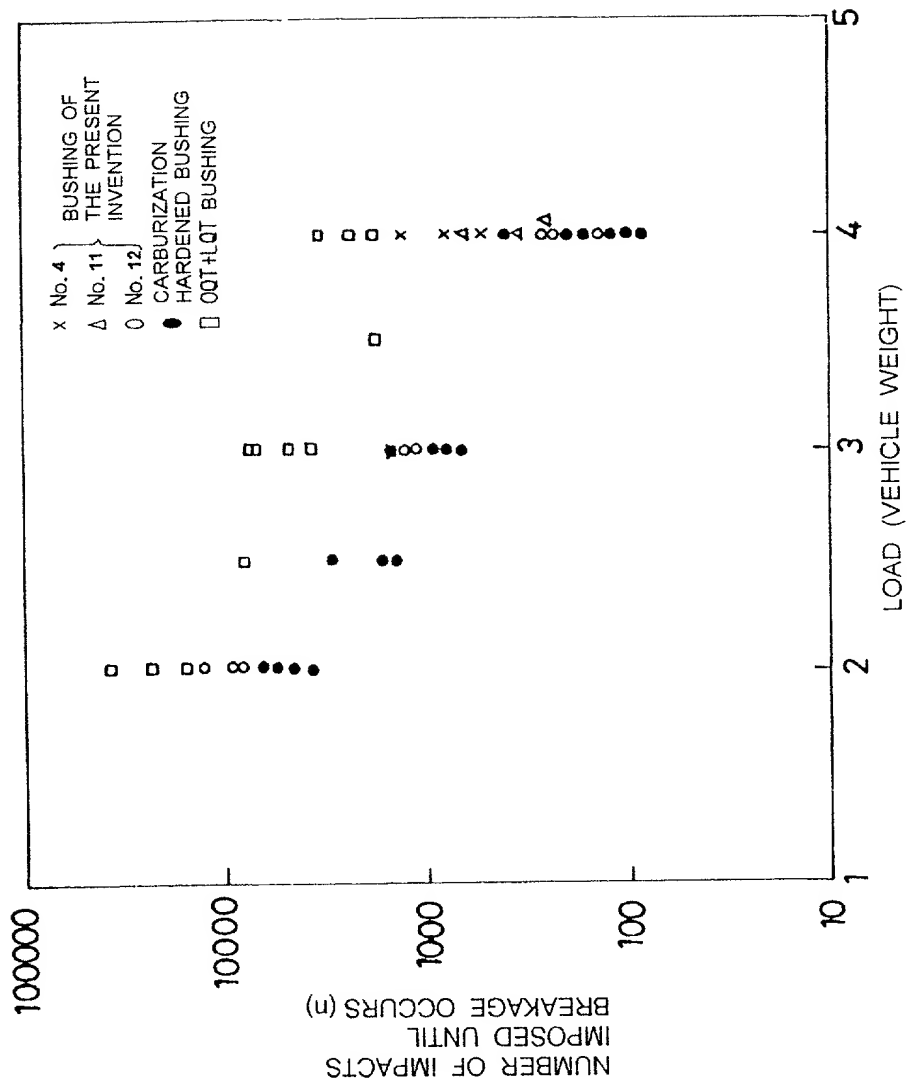


FIG. 33



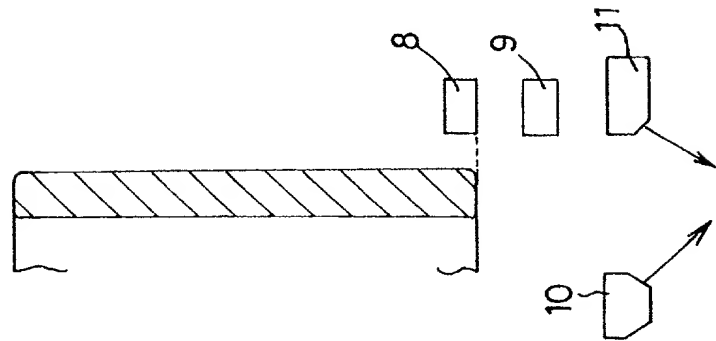


FIG. 34 (a)

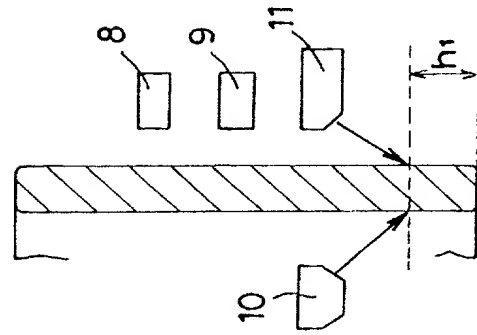


FIG. 34 (b)

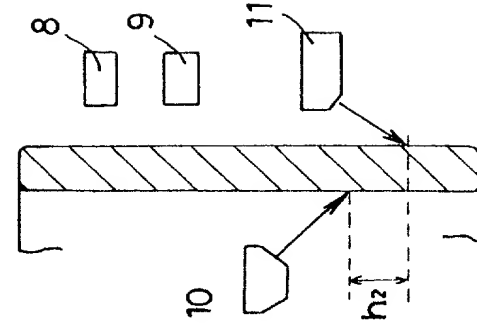


FIG. 34 (c)

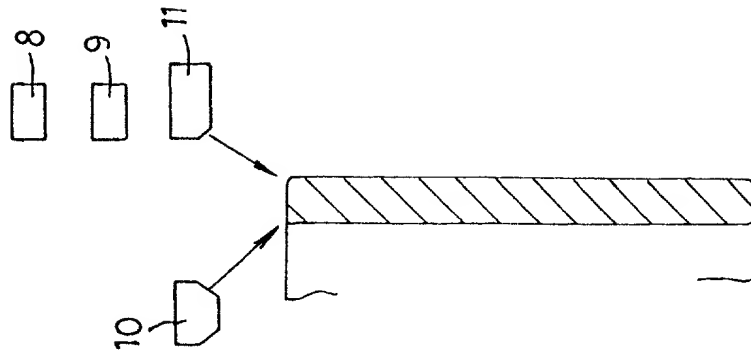


FIG. 34 (f)

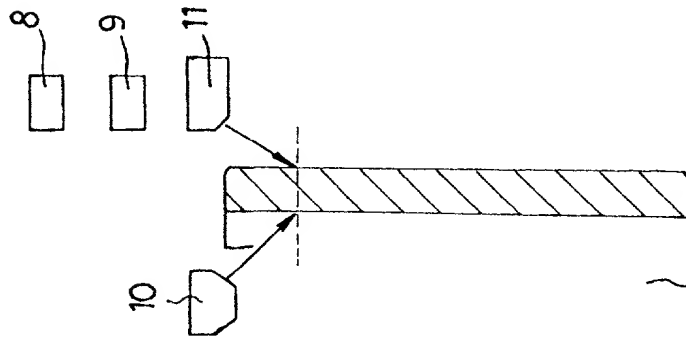


FIG. 34 (e)

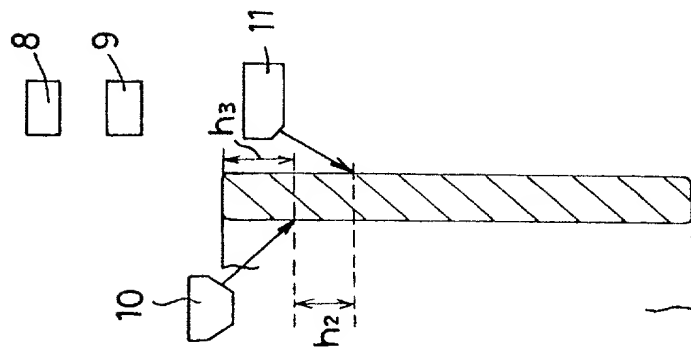


FIG. 34 (d)

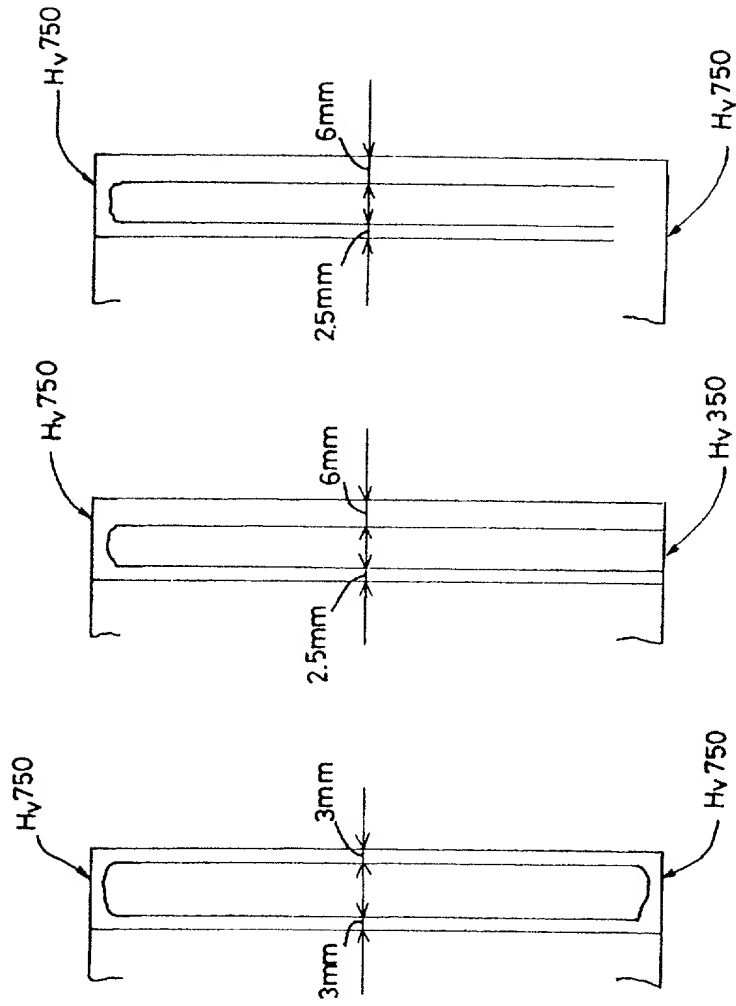


FIG. 35 (a)

FIG. 35 (b)

FIG. 35 (c)

FIG. 36

